establishment, in 1889, the club migrated to Limmer's Hotel, where it now meets.

As the club grew older, the price of its dinners grew with it, from "one shilling and sixpence, for eating," in 1743, to ten shillings in 1843, at which latter price it has remained ever since. The time of dinner has also changed first from 1 o'clock to 2, and then successively to 3, 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$, 6, and $6\frac{1}{2}$, the time of serving now.

The bill of fare for the commemorative dinner last Thursday was copied, spelling and all, from the earliest *menu* preserved, that of March 28, 1748, and the price to the members was 1s. 6d., the same as in the earliest days of the club.

The bill of fare was as follows:—

Two dishes Fresh Salmon, Lobster Sauce.
Cod's Head.
Pidgeon Pye.
Calve's Head.
Bacon and Greens.
Fillett of Veal.
Chine of Pork.
Plumb Pudding.
Apple Custard.
Butter and Cheese.

The members are indebted to the managers of Limmer's Hotel for the readiness with which they entered into the project of reproducing a dinner on the ancient model.

As the month was November, salmon was not to be had, so that other fish was substituted. An important addition was made to the *menu*, for a haunch of venison was presented to the club by one of its members.

In early days whole bucks, haunches of venison, turtles, and barons of beef were not unfrequently presented, the donors being in each case elected honorary members for the then current session.

These contributions became rather inconvenient, and on July 29, 1779, it was "resolved that no person in future be admitted a member of this Society in consequence of any present he shall make to it."

The club consists of fifty ordinary members, and this number is increased by *ex officio* members (present or past office-bearers in the Royal Society) and by a few honorary (octogenarian) and supernumerary members, until the total in 1893 has reached sixty-one. Of these forty-four were present on the 16th, with twenty-three guests, making a total of sixty-seven.

From the earliest times each member of the club has had the privilege of bringing one guest with him, the President for the day being not limited to one. This practice of bringing guests has been generally carried out, and a study of the list of visitors given in Admiral Smyth's "History" shows that many of the leaders of European science have at various times entered their names in the club records. Berzelius, Cuvier, Gay-Lussac, Linnæus, and Volta were guests of which any club may justly be proud.

We may also fairly assert, in conclusion, that since the middle of the last century, there are but few names really prominent in British science which do not appear in the list of ordinary members of the Royal Society Club at some time of its existence.

THE DE MORGAN MEDAL.[1]

THE duty has this year devolved upon the Council of making the fourth triennial award of the medal which was instituted in memory of our first President, the distinguished logician and mathematician, Augustus De Morgan. In making their award, the Council are not restricted in their choice to mathematicians of this country, or to the recognition of excellence in any particular branch of mathematical science. It will scarcely, however, be imputed to them that they have been influenced by feelings of patriotism rather than by scientific impartiality in having selected as the first three recipients of the medal, Prof. Cayley, Prof. Sylvester, and Lord Rayleigh. The position of those eminent mathematicians suffers no depreciation, if our survey is extended beyond the borders of our own country. On the other hand we shall, I think, be equally exempt from adverse criticism in the choice we have this year made of Felix Klein, Professor of Mathematics in the University of Göttingen, as the next recipient of the honour which we are privileged to confer.

Prof. Klein, who has for many years been enrolled in our books as an honorary member of our Society, has attained the highest distinction as a mathematician. In estimating the value of his work, a mere consideration of the advance due to him in our knowledge of the details of special subjects would be sufficient to place him in the first rank; the wide influence of his work must be apparent to anyone who studies the memoirs of writers, of whatever country, on those subjects to which he has set his hand. Let me in particular refer to his contributions to the geometry of complexes, and to non-Euclidean geometry, to his memoirs on the theory of equations, on the transformation of elliptic functions, on the general theory of functions, especially in exposition and development of Riemann's theory, to his discussion of Riemann's surfaces, and, in more recent times, his researches on Abelian and Hyperelliptic functions, to his treatment of the polyhedral functions, automorphic functions, and of the elliptic Modular functions, the last of which is expounded in the treatise by Fricke on the subject. One must not forget to record the fact that his important memoir on the transformation of elliptic functions in the *Mathematische Annalen*, vol. xiv., was preceded by a communication made to our Society in 1878; Prof. Klein thus doing us the honour of indicating in advance the principal results he had obtained (*Proceedings*, vol ix. p. 23).

But, in the necessarily brief remarks to which I must limit myself this evening, to indicate Prof. Klein's claims to distinction by dwelling upon individual subjects which he has treated, would, I think, be wanting in perspective and proportion. Great as is the reputation which he has acquired in connection with particular branches of mathematical research, that which would seem to be his especial merit is the comprehensiveness of his view, and the uniformity of his treatment. For him the study of one of his special subjects is the study of all; the binding influence being the theory of discrete groups, a theory he has made his own. With this unity of conception he combines a great power of simple, elegant, and interesting expression. The expositions of his method contained in his early "Comparative Review of Recent Researches in Geometry," and his more recent "Lectures on the Icosahedron," in which the formal identity of investigations apparently the most diverse is made apparent, belong to the romance of mathematics. The important influence which his mode of investigation has had and is destined to have on the progress of the higher mathematics, the encouragement of largeness of view, rather than the elaboration of minutiæ, and the stimulating influence he exercises upon pupils who now hold positions of eminence in Germany, must take a foremost place among the grounds upon which we honour Prof. Felix Klein to-day by the award to him of the De Morgan Medal.

NOTES.

THE agricultural exhibit of Sir John Lawes and Sir Henry Gilbert at Chicago appears to have been much appreciated by our American cousins. The Association of American Agricultural Colleges and Experiment Stations have passed a special resolution expressing the value they attach to the exhibit, and the Director-General of the Exposition has forwarded the same to England, with the added thanks of the Exposition, for "the great benefit done to American agriculture by this excellent and instructive exhibit."

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[1] Address to the London Mathematical Society, on the occasion of the presentation of the De Morgan Medal, November 10, 1893, by the President, A. B. Kempe, F.R.S.

A Pasteur Institute has been opened in New York, with Dr. Paul Gibier as its director.

M. O. Callandreau, of the Paris Observatory, has been appointed Professor of Astronomy at the École Polytechnique.

Dr. Treadwell has been appointed Professor of Analytical Chemistry in the University of Zurich.

Dr. A. K. E. Baldamus, known for his work in connection with ornithology, died on October 30, at the age of eighty-two.

Mr. J. Bailey Denton, whose name has long been known to agriculturists and civil engineers, died on November 19, at Stevenage, Herts, in his seventy-ninth year.

We regret to announce the death, at the age of eighty-one, of M. Chambrelent, a member of the Rural Economy Section of the Paris Academy of Sciences.

Mr. William Dinning, of Newcastle, a lover of natural science and a promoter of its interests, died on November 13. Shortly before his death, he offered his collection of fossils from the coal measures to the Newcastle Natural History Society, on the condition that the society would provide cases to properly exhibit it and the collection already existing in the local museum. The society was without the necessary means, but Lord Armstrong has promised to contribute a sum of £1500 for this purpose. Mr. Dinning was an engineer by profession, but all his leisure was devoted to scientific pursuits. His death will be greatly felt in local circles.

It is reported that a severe shock of earthquake was experienced on November 17 in Kashan, Western Asia, a large part of the town being destroyed. Great damage was also done at Samarcand.

Mr. Lloyd Bozward, Worcester, informs us that on November 17 a fine shower of Leonid meteors was seen throughout the night. The meteors are said to have been so numerous that several persons unacquainted with their nature mistook the display for an exhibition of fireworks.

The Swiney prize of a cup, value £100, and money to the same amount, to the author of the best published work on jurisprudence, will be awarded by the Society of Arts and the College of Physicians in January next. The prize is awarded every fifth year, the recipient in 1889 being Dr. C. Meymott Tidy, for his work entitled "Legal Medicine."

At the beginning of next year the first number of an "Index der gesamten chemischen Litteratur" will be published by H. Bechhold, Frankfort. The index will appear monthly, and after the end of each year an index comprising all the papers published during the year in pure and applied chemistry will be issued. The editor of the forthcoming publication is Dr. Julius Ephraim.

Messrs. W. H. Allen and Co. have in preparation a series of volumes founded upon Jardine's Naturalist's Library. The editor of the series, Dr. Bowdler Sharpe, will undertake several of the ornithological volumes. The authors of other sections are Mr. R. Lydekker (Mammalia), Mr. H. O. Forbes (Mammalia and Birds), Mr. W. R. Ogilvie Grant (Birds), Mr. W. F. Kirby (Insects), Prof. R. H. Traquair, F.R.S. (Fishes). The first volumes will be issued early in 1894, and will consist of British Birds, vol. i., by Dr. R. Bowdler Sharpe; Monkeys, by H. O. Forbes; and Butterflies (with special reference to British species), by W. F. Kirby.

We have previously referred to the fact that on the first of this month Italy adopted the time of Central Europe. All the Italian time-tables have, by order of the Minister of Public Works, been printed with the hours marked up to twenty-four from midnight to midnight. The railway clocks have also been modified, and the hours from 13 to 24 printed in red Arabic characters in a circle interior to the old one. It may be well to remember that at the Paris Exhibition in 1867, Sig. G. Jervis, the Keeper of the Royal Industrial Museum of Turin, exhibited a clock face having a double series of hours, the higher numbers being placed on the exterior circle on account of the greater space there available. He also exhibited a time-table drawn up on the 24-hour plan, and possessing many advantages over those in use even at the present time. Mr. Jervis has thus had the satisfaction of seeing the adoption of the improved clock-dial and the 24-hour time-table, proposed by him nearly a third of a century ago.

During the past week this country has experienced some of the most destructive, if not the most violent storms that have occurred for some years. The reports received by the Meteorological Office on Thursday morning, the 16th instant, showed that a deep disturbance was approaching our shores, and storm signals were hoisted on our coasts. On the afternoon of that day the storm broke with great violence over the west of Ireland, the direction of the wind being south-easterly with a moderately high temperature, while the barometer was below 29·5 inches. The centre of the storm passed across England and Scotland, taking the ordinary north-easterly course, and by 6 p.m. on Friday it lay off the extreme north-east coast of Scotland, and the barometer had fallen to 28·5 inches; the wind, as usual in the rear of storms, shifted to the north-westward, causing a sudden fall of temperature with heavy snow and hail in many places. At this point the track of the disturbance took a very unusual direction, and during Friday night the centre moved quickly to the south-eastward down the North Sea, and at 8 a.m. on Saturday, the 18th instant, the centre lay off the north-east coast of England, while the pressure rose rapidly over the western portion of the kingdom, causing steeper gradients and bitter northerly and north-easterly winds. The storm first broke over London and the southern parts of the country on Saturday afternoon, and blew in terrific squalls during the whole of Saturday night, the centre again resuming an easterly course across the North Sea to the Dutch and North German coasts. The greatest strength of the wind appears to have been experienced near Holyhead, where the force on Saturday morning was reported as 12 of the Beaufort scale, while force 11 was reported from Wick and Scilly. In the neighbourhood of London the heaviest gusts were experienced in the early part of Saturday evening; the anemometer at Greenwich recorded a pressure of 17 pounds on the square foot at about 6 p.m. On Sunday and Monday the wind force was still high in the south-east of England, as well as in the English Channel, and a very high sea was running on our coasts. The storms were also very violent on the other side of the Channel, and were accompanied by heavy falls of snow in many parts of the Continent.

The Pilot Chart of the North Atlantic Ocean shows that the first half of October was marked by much bad weather north of latitude 45° between Newfoundland and the British Isles. One of the storms caused immense loss of life and property in Louisiana, owing to a tidal wave encroaching over the low-lying lands. A supplement issued with the chart shows clearly the actual weather conditions between the 23rd and 28th of

August last, west of longitude 50° W. During this period two severe storms occurred; the first struck the coast in the vicinity of New York, where much damage was done to shipping, the second struck the coast near Savannah, and occasioned frightful loss of life along the coasts of South Carolina and Georgia, the barometer falling to 28·29 inches at 6 a.m. on August 28. This was the storm referred to in our issues of 31st August and 7th September.

THE annual meeting of the Royal Geological Society of Cornwall was held at Penzance on November 10, when the president, Mr. Howard Fox, delivered an address, in which he reviewed the past history of the society. In the course of his remarks, he said that the rocks of West Cornwall had been subjected to precisely the same conditions as those of Moffat and Girvan, in South Scotland, described by Prof. Lapworth. They show, in fact, a repetition of the same phenomena, except that as yet no band of fossiliferous rock characteristic of a special geological zone has been discovered as a horizon of reference. It is, therefore, worth consideration whether the radiolarian cherts of Mullion Island, described in the *Quarterly Journal of the Geological Society* for this year, will not answer the same purpose. The Mullion Island cherts consist of easily-recognised bands of mostly black flint-like rock, generally reticulated with thin but conspicuous white quartz veins. They are extremely hard and resistant of both atmospheric and subterranean agents of destruction. They are of sufficient thickness to form a distinctly marked feature in the ascending sequence, and having been originally deposited on the floor of a deep ocean as radiolarian ooze, they necessarily occupy a wide horizontal extent of country. They occur in distinct bands, mostly in shales or crushed dark slates; they break with a conchoidal fracture, and when sheared or impure the microscope can generally determine their nature. The fossils are radiolarian deep-sea forms like those of the present day. Messrs. Teall and Lapworth have traced these cherts with Mr. Fox for 800 yards in the cliffs and on the foreshore north of Porthallow in-Meneage, and during the past summer they have been traced at intervals through the parishes of Veryan, Gorran, and Caerhayes. Pebbles have been found on the north coast, which under the microscope show radiolaria with their structure still visible, but the parent rock has not yet been found *in situ*. It will therefore be agreed that these cherts most certainly should be traced wherever they appear in Cornwall. Their age is undoubtedly Ordovician, yet the precise zone to which they belong can only be determined by discovering some typical fossils in the shales and slates associated with them. In South Scotland officers of the geological survey have recently traced such cherts with radiolaria from sea to sea just beneath the Llandeilo rocks, fixing horizons exactly. The cherts in Cornwall, possibly of the same age, and certainly of the same character, are equally promising in the midst of the entangled rocks around, to form the datum line, or clue to the succession.

A COLLECTION of land and marine shells of the Galapago Islands was made during the voyage of the U.S. Fish Commission steamer *Albatross* in 1887–88. A report on this mollusc fauna, prepared by Dr. R. E. C. Stearns, has recently been issued from the U.S. National Museum. It is not an exhaustive review of the collection, but includes the principal collections previously made, and also a few notes of interest. The extreme tenacity of life of land snails in every stage of growth is well known. Dr. Stearns gives the following instances that came under his own observation:—"In December, 1865, the Stearns collection, now in the National Museum, was enriched by the acquisition of several examples of *Helix Veatchii*, Newcomb, now regarded as a variety of *H. areolata*, that were collected by Dr. Veatch on Cerros or Cedros Island off the coast of Lower California in 1859. The specimens were given by Dr. Veatch to Thomas Bridges, and upon the death of the latter came into my possession with the remainder of the Bridges shells. One day, upon a careful examination, I discovered that one of the specimens was apparently still alive, and placed it in a box of moist earth; after a while it protruded its body from the shell and commenced moving about, and seemed to be no worse for its long fast of at least *six years*. *H. Veatchii*, it will be observed, beat the time of the famous British Museum example of *H. desertorum*, which lived without food within a few days of *four years*. In March, 1873, Prof. George Davidson, of the United States Coast Survey, while at San José del Cabo, Lower California, collected a number of specimens of *Bulimus pallidior*, and subsequently gave me a part of them, which I put in a box, where they remained undisturbed until June 23, 1875, when they were placed in a glass jar with some chick-weed and a small quantity of tepid water. They soon woke up and began to move about apparently as vigorous as ever after their long nap of *two years, two months, and sixteen days.*"

THE delicacy of the sense of taste among Indians has been tested by Mr. E. H. S. Bailey, and the results compared with those obtained from whites (*Kansas University Quarterly*). The method of testing was by solutions of different strengths, the substances quinine sulphate (bitter), sulphuric acid (sour), bicarbonate of soda (alkaline), cane sugar (sweet), and common salt (salt) being selected as representing classes of the common familiar substances most likely to be recognised. The only one of these that experience has shown is not familiar is the alkaline taste. From an examination of the results it appears that the order of delicacy is about the same for the two races. By this it is meant that the smallest proportion of quinine was detected; acid solutions come next in the order of action upon the organ of taste, and then salt. In the case of whites, sweet solutions were more detectable than alkaline ones, but the reverse was the case with the Indians. This does not count for much, however, as the Indians had great difficulty in distinguishing between the alkaline and salt solutions. As might have been expected, the ability to detect the different substances when they are in very dilute solution is less in the Indians than in the whites. The males of both races are able to detect a smaller quantity of salt than the females, but in all other cases the females appear to have the more delicate organ of taste.

THE question as to whether gases are capable of emitting heat has been investigated by many physicists, most of whom have come to the conclusion that the characteristic spectra of glowing gases are chiefly, if not solely, due to some chemical action going on within the gas. Hittorf heated air in platinum tubes a few centimetres long over a Bunsen, and Siemens treated air, carbonic acid, and steam in a similar manner, using longer tubes and higher temperatures. Both were unable to discover any radiation by the gases when thus simply heated, and Pringsheim, after more recent work, came to the conclusion that emission spectra cannot be obtained by simple heating. Mr. F. Paschen has, however, quiet recently (*Wied. Ann.* No. 11) succeeded in discovering and mapping such spectra by a modification of Tyndall's experiment with gases rising from an incandescent body, substituting the bolometer for Tyndall's thermopile. The hot body employed was a spiral band of platinum forming a narrow tube, which was heated by passing an electric current through the platinum. The gases were sent through this spiral, and thus acquired a temperature of about 1000° C. The temperature was measured by means of a platinum : platinum-rhodium thermocouple with an excessively small junction. The spectrum was formed by a fluorspar prism and two concave mirrors, adjustable automatically to minimum deviation for any wave-length. The gases examined were air, oxygen, carbon dioxide, and steam. Only the last two gave positive results, some small deflection in the first two being due to slight traces of moisture. Carbonic acid showed a very sharp maximum far in the infra-red. The bolometer strip was too broad to determine whether it was a line or a band, but it is most probably a somewhat ill-defined line. Steam showed about eight maxima, which must be described as bands. A comparison of the spectrum of the Bunsen flame with that of the hot products of combustion arising from it showed that the spectra obtained are similar and of almost equal intensity; so that it is very probable that the spectra of hot gases are chiefly due to temperature, and not to chemical action. A curious and hitherto unexplained observation is that of a slight shifting of the maxima towards the more refrangible end of the spectrum when the temperature is lowered.

To determine correctly the values of the critical constants of a substance is a matter of considerable difficulty: the estimation of the critical temperature, however, is generally believed to be both expeditious and accurate. The usual method of taking an observation of the critical temperature consists in heating the liquid in contact with its saturated vapour in a closed space to a temperature above the critical temperature, allowing the substance to cool, and noting the temperature t_c at which the meniscus of the liquid just appears in the misty contents of the closed space. In the current number of *Wiedemann's Annalen*, Herr Galitzini gives evidence to show that t_c thus determined, although it is independent of the amount of substance contained in the closed space, is lower (it may be considerably lower) than the true critical temperature, or the temperature at which liquid and saturated vapour have the same density. By very slow and regular cooling he also finds that the peculiar misty appearances which are usually held to be invariably associated with the critical state are not observed. Amongst other conclusions, his experiments, which it is to be noted were made on ether, lead him to believe that at temperatures even considerably higher than the critical temperature a substance at constant pressure may have different densities, different in some cases to the extent of 25 per cent. This last result the author attributes to the presence of molecular complexes in the substance: if its validity is established, it will of course overthrow the generally accepted idea that at any temperature above the critical temperature for a given value of the pressure there is only one value of the volume.

AN interesting paper on the various electric wave systems obtained by Lecher's method has been communicated to the R. Accademia della Scienza di Torino by Signor Mazotto. The effect of varying the lengths of the primary and secondary wires, and the distance apart of the plates of the condensers, has been studied. As an indicator of the points of maximum difference of potential along the wires, the author uses two short wires partly coiled round india-rubber tubes, which slide along the secondary wires, the ends of the wires being brought to within about 2 cm. of each other. If, when the apparatus is working in the dark, the fingers are brought near the platinum tips of these wires, two small luminous stars appear at these tips when the bridge over the secondary is in the vicinity of a node. When at a node these sparks become very conspicuous, even without the presence of the fingers. This indicator is said to have the advantage over the Geissler tube used by Lecher, that it shows more distinctly the maxima and minima, is less fatiguing to the eyes, and less capricious in its action. The number of nodal systems formed when, the primary system being kept constant, the bridge on the secondary wires is moved to different parts, were found to be more numerous than Lecher's observations would seem to indicate. The "harmonics" of the fundamental system were not the only higher systems that were produced, it being found possible, by altering the position of the bridges to produce any system intermediate between two harmonics It was also found, when the second bridge was placed at a fixed point, that the nodal systems obtained by moving the first bridge were independent, in position and intensity, of the state of the system beyond the second bridge. The wave-lengths obtained experimentally were compared with those given by the formula of Salvioni, and found to agree fairly well. The curves obtained by the author, and a full account of his method, has been published in the *Electrician*, vol. xxxii. p. 60.

THE following translation of a reply given by Prof. Galileo Ferraris to a young lady who asked what electricity was, is given by the *Electrician*. Prof. Ferraris has conferred a great benefit on all those who are supposed to have any knowledge of that magic science electricity, and are therefore continually being asked this question, though whether the reply satisfied the questioner is rather doubtful. His reply was:—"Maxwell has demonstrated that luminous vibrations can be nothing else than periodic variations of electro-magnetic forces; Hertz, in proving by experiments that electro-magnetic oscillations are propagated like light, has given an experimental basis to the theory of Maxwell. This gave birth to the idea that the luminiferous ether and the seat of electric and magnetic forces are one and the same thing. This being established, I can now, my dear young lady, reply to the question that you put to me: What is electricity? It is not only the formidable agent which now and then shatters and tears the atmosphere, terrifying you with the crash of its thunder, but it is also the life-giving agent which sends from heaven to earth, with light and heat, the magic of colours and the breath of life. It is that which makes your heart beat to the palpitations of the outside world, it is that which has the power to transmit to your soul the enchantment of a look and the grace of a smile."

THE current *Comptes Rendus* contains an important correction to the numbers given by M. Blondlot for the velocity of an electric disturbance in high conductivity copper (*Comptes Rendus*, October 23). The values were expressed in kilometres per second instead of thousands of kilometres per second, so each of the velocities given in our issue of November 9 (p. 37) must be increased by one thousand, in order to be correct.

A VERY important paper, by Dr. Uschinsky, on the cultivation of pathogenic bacteria in media, devoid of all albuminoids, appears in the *Archives de médecine expérimentale*, No. 3, 1893. Pathogenic organisms thus grown do not lose their virulent properties and, moreover, elaborate toxic substances, for on passing the media in which they have been cultivated through a Chamberland filter, the filtrate was found to be toxic. In a more recent paper, published in the *Centralblatt für Bakteriologie*, vol. xiv. No. 10, 1893, Dr. Uschinsky states that in order to obtain more satisfactory growths of the bacteria in question, he has introduced some modifications into the composition of the culture medium, which now affords as suitable a pabulum for their cultivation as ordinary bouillon. The following is the composition of this non-albuminous medium:—Water, 1000; glycerine, 30–40; sodium chloride, 5–7; calcium chloride, 0·1; magnesium sulphate, 0·2–0·4; dipotassium phosphate, 2–2·5; ammonium lactate, 6–7; sodium aspartate, 3·4. The organisms of cholera, diphtheria, tetanus, typhoid and others have all been grown successfully in the above. The poisonous substances elaborated by bacteria are, therefore, not necessarily due to their decomposition of the albumen contained in the ordinary culture media employed, but must rather be regarded as the result of synthesis; the materials produced, says Dr.

Uschinsky, belonging in all probability to the proteid bodies, and bearing much resemblance to ferments.

DR. USCHINSKY has made a special study of the tetanus bacillus when grown in this medium, and has examined in some detail the nature of the toxic products thus elaborated. A more satisfactory growth of this organism was procured by adding from one to two per cent. of grape-sugar to the solution, and the anaërobic conditions necessary for its cultivation were obtained by pouring liquid paraffin on the surface. The filtrate of such tetanus cultures was about equal in virulence to that derived from ordinary broth-cultivations of the bacillus. On the other hand, the poisonous properties of the former were far more easily removed than was the case with the broth-cultures, being destroyed by precipitation with alcohol, and also frequently by evaporation *in vacuo* at 33-36° C., this being especially the case when the latter was carried out in the presence of light. By addition of strong alcohol a precipitate was obtained, in which, besides salt, small quantities of albuminous bodies were present, as indicated by Millon's reagent and the xanthoproteic reaction. This precipitate was, however, without any toxic properties.

THE second edition has been issued of a general guide to the Manchester Museum, by Mr. W. G. Hoyle, Keeper of the Museum. The book should be useful in directing attention to the most important specimens, and explaining their character. Its value would be greatly increased, however, by the addition of an index.

"A BIBLIOGRAPHY of Vertebrate Embryology," by Mr. C. S. Minot, has been published by the Boston Society of Natural History. The titles are grouped into subjects, and the subjects are alphabetically arranged, so there is no difficulty in finding the original source of any paper, the title of which is known. An index of authors is also given to facilitate reference. Biological investigators will find the bibliography of great assistance.

THE volume of selections from the philosophical and poetical works of Miss Constance C. W. Naden, compiled by the Misses E. and E. Hughes, and published by Messrs. Bickers and Son, is one of the daintiest that we have seen for some time. The selections from her essay on induction and deduction contain some remarkably fine expressions, and many other parts of the book are of great interest.

MR. P. ANDERSON GRAHAM'S "All the Year with Nature" (Smith, Elder, and Co.) contains a number of reprints of articles originally contributed to various magazines. The author has a chatty style, and his heterogeneous collection will serve to while away an hour or two. The connection of many of the articles with the seasons is not very apparent, and some of the statements are not scientifically accurate, but, taken as a whole, the book is well worth reading.

PART I. of the sixth edition of Prof. Michael Foster's well-known "Text-Book of Physiology" has been published by Messrs. Macmillan and Co. It comprises the first book of the original volume, and deals with the blood, the tissues of movement, and the vascular mechanism. A number of important modifications have been made in the section devoted to the phenomena and mechanism of the heart-beat, but with this exception few changes have been introduced. Since the publication of the first edition, seventeen years ago, Prof. Foster's work has been recognised to be the best of its kind, and the issue of a new edition shows that it retains its position as a physiological "classic."

THE fourth volume of Alembic Club Reprints, published by Mr. W. F. Clay, Edinburgh, is before us. It deals with the foundations of the molecular theory of gases, and comprises papers and extracts of papers by Dalton, Gay-Lussac, and Avogadro. There is no better way of studying the development of an idea than by reading such reprints as those issued under the auspices of the Alembic Club, for they enable the student to see the many difficulties that have to be overcome before a theory crystallises into shape. We therefore welcome this last addition to an excellent series of books.

THE Cambridge University Press has published the first volume of the series of manuals of biological science edited by Mr. Arthur E. Shipley. The book to which we refer is "Elementary Palæontology," by Mr. Henry Woods. In it the author gives a concise account of invertebrate palæontology, chiefly considered from a stratigraphical point of view. The plan of the book is excellent, the zoological features of each group being first described, then the genera of importance geologically are classified, and with this knowledge the student is able to understand the following section dealing with the distribution of the group. Instead of giving archaic illustrations of genera, Mr. Woods includes figures required to explain structure and terminology. The student will benefit by this change. Remarkable pictures of perfectly preserved fossils may suit the popular mind, but the student must study fossils in collections, and he needs more detailed instruction concerning their characteristics. As an introduction to the study of palæontology, Mr. Woods' book is worthy of high praise.

NOTES from the Marine Biological Station, Plymouth.—The past week has been one of the stormiest of the year. Work outside the Sound was quite impossible in our small boats, and even within the harbour was attended with difficulties. The captures included specimens of the Actinian *Cylista viduata*, and of the Dorididæ *Platydoris planata*, *Ægirus punctilucens* and the scarlet *Rostanga coccinea* upon the red incrusting sponge on which it feeds From several hauls of *Antedon rosacea* a small number of the Polychæte commensal *Myzostomum* were obtained. The dogfish in the aquarium (*Scyllium catulus* and *canicula*) have begun to breed.

THE additions to the Zoological Society's Gardens during the past week include a Mozambique Monkey (*Cercopithecus pygerythrus*, ♂) from East Africa, presented by Mr. Bayes; a Rhesus Monkey (*Macacus rhesus*, ♀) from India, presented by Mr. C. E. Morres; two —— Jerboas (*Alectaga jaculus*) from Persia, presented by Capt. R. A. Ogilby, F.Z.S.; a Tuatera Lizard (*Sphenodon punctatus*) from New Zealand, presented by Mr. Chas. Smith; a Lion (*Felis leo*, ♀) from West Africa, an American Bison (*Bison americanus*, ♀) from North America, deposited; a Cunning Bassaris (*Bassaris astuta*) from Mexico, purchased.

OUR ASTRONOMICAL COLUMN.

MECHANICAL THEORY OF COMETS. — Prof. J. M. Schaeberle, in the *Astronomical Journal*, No. 306, communicates a "preliminary note on a mechanical theory of comets," this being "a strictly logical consequence of the mechanical theory of the corona." The principles which serve as a basis may be said very briefly to be the following. Any given solar eruption gives rise to both prominences and streams. The ejective force being the same, the mass of a given volume of coronal stream is less than that of a prominence. Assuming mean density of coronal stream to be one-seventh of that of accompanying prominence, the same explosive force which during the last eclipse sent prominences to a height of 80,000 miles, will send coronal matter forming the streams to an infinite distance. Coronal streams extend far, then, into space. The densest portion of the stream is located at the point of minimum velocity, and the coronal streams visible in the last total eclipse were, Prof. Schaeberle says, according to his photographs, apparently most dense in the higher regions,